

**PSG COLLEGE OF ARTS & SCIENCE**  
(AUTONOMOUS)  
**BSc DEGREE EXAMINATION MAY 2024**  
(Second Semester)

Common to Branches – **MATHEMATICS &**  
**MATHEMATICS WITH COMPUTER APPLICATIONS**

**PHYSICS- II**

Time: Three Hours

Maximum: 75 Marks

**SECTION-A (10 Marks)**Answer **ALL** questions**ALL** questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following quantities remains constant throughout simple harmonic motion? a) Velocity      b) Acceleration c) Kinetic energy   d) Total mechanical energy	K1	CO1
	2	What is the restoring force in simple harmonic motion proportional to? a) Displacement   b) Velocity c) Acceleration   d) Time	K2	CO1
2	3	Which of the following waves does NOT belong to the electromagnetic spectrum? a) Sound waves   b) Radio waves c) X-rays      d) Gamma rays	K1	CO2
	4	What is the speed of electromagnetic waves in a vacuum? a) 300,000 meters per second b) 150,000 meters per second c) 30,000 meters per second d) 3,000 meters per second	K2	CO2
3	5	What is the function of the cladding layer in an optical fiber? a) To provide mechanical support b) To protect the core from damage c) To enhance signal strength d) To increase the refractive index of the fiber	K1	CO3
	6	Which phenomenon allows light to propagate through an optical fiber by repeatedly reflecting off the cladding-core interface? a) Refraction      b) Diffraction c) Reflection      d) Absorption	K2	CO3
4	7	What is the Seebeck coefficient? a) The ratio of temperature difference to the electric potential difference b) The ratio of electric current to the temperature difference c) The ratio of electric potential difference to the temperature difference d) The ratio of electric current to the electric potential difference	K1	CO4
	8	What is the unit of measurement for the Seebeck coefficient? a) Volts per meter (V/m) b) Ampere (A) c) Kelvin per watt (K/W) d) Microvolts per degree Celsius ( $\mu\text{V}/^\circ\text{C}$ )	K2	CO4

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5	9	What happens to the current flow in a junction diode when it is forward biased? a) Current flows easily      b) Current flow is blocked c) Current flow is negligible      d) Current flow is reversed	K1	CO5
	10	What is the breakdown voltage of a Zener diode? a) Approximately 0.7 volts      b) Approximately 1.1 volts c) Approximately 5 volts      d) It depends on the specific diode	K2	CO5

**SECTION - B (35 Marks)**

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Define simple harmonic motion. What are its characteristics?	K2	CO1
		(OR)		
	11.b.	A metal disc of 0.1 m radius and mass 1 kg is suspended in a horizontal plane by a vertical wire attached to its centre. If the diameter of the wire is $10^{-3}$ m, its length 1 m, and the period of torsional vibrations is 4 seconds, find the rigidity modulus of the wire.		
2	12.a.	Derive the relation between $\mu$ and $\epsilon_r$ .	K2	CO2
		(OR)		
	12.b.	Explain the transverse nature of plane waves.		
3	13.a.	Explain the modes of Propagation in optical fibres.	K4	CO3
		(OR)		
	13.b.	Discuss about fiber optic sensors.		
4	14.a.	Explain the Variation of thermoelectric e.m.f with temperature.	K3	CO4
		(OR)		
	14.b.	State and explain thermoelectric laws.		
5	15.a.	Explain the I-V characteristics of a zenor diode.	K5	CO5
		(OR)		
	15.b.	Explain the construction and working of a solar cell.		

**SECTION -C (30 Marks)**

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Discuss the free and damped oscillations.	K2	CO1
2	17	Derive equations for maxwell's wave equations for free space	K2	CO2
3	18	Explain the classification of optical fibres.	K3	CO3
4	19	Obtain the relation between Thomson coefficient and thermoelectric power.	K3	CO4
5	20	Discuss about LED in detail.	K4	CO5